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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/116,589 07/16/98 NISHIKAWA

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MM91/1115
SUGHRUE MION ZINN MACPEAK & SEAS
2100 PENNSYLVANIA AVENUE N W
WASHINGTON DC 20037-3202

EXAMINER

CHANG, A

ART UNIT

PAPER NUMBER

2872

DATE MAILED:

11/15/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/116,589

Applicant(s)

NISHIKAWA ET AL.

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2000 and 18 September 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28, 29 and 63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28, 29 and 63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

Continued Prosecution Application

1. The request filed on September 18, 2000 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/116,589 is acceptable and a CPA has been established. An action on the CPA follows.

Remark

2. This Office Action is also in response to applicant's preliminary amendments filed on August 17, 2000 and September 18, 2000, which has been entered as paper numbers 13 and 17.

3. By these amendments, claims 1-27 and 30-62 have been canceled and claim 63 has been newly added by the applicant. Claims 28, 29 and 63 remain pending in this application.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "striking reconstructing illumination light ... on a side of said first (or second) transmission type hologram that is not opposite to said photosensitive material" recited in claim 29 appears to be vague, confusing and indefinite since it is not clear how would the reconstructing light strike "the side that is not opposite to the photosensitive material". It appears, as demonstrated in Figures 18(b) to 18(c), the "not opposite side" of the transmission type hologram is next to the photosensitive material and the reconstructing illumination light (108) strikes (usually means first incident into) the transmission type hologram (106) from the side that is opposite to the photosensitive material. It appears there is in no way that the

Art Unit: 2872

reconstructing illumination light (108) would strike or first enter the transmission hologram from the side not opposite or adjacent to the photosensitive material. Although the reconstructing illumination light would pass through the not opposite side, however strictly speaking it is not the reconstructing light but the diffracted light that passes through the not opposite side. A more correct description should be: "the reconstructing illumination light strikes the transmission type hologram from the opposite side with respect to the photosensitive material. The diffracted light from the hologram then exits from the hologram from the not opposite side with respect to the photosensitive material and enters the photosensitive material".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Kawazoe et al (PN. 5,781,317).

Kawazoe et al teaches methods for producing holographic optical element wherein the methods comprise the step of adhering a hologram recording film (2013 or 2254), having a photosensitive film (2132), on a master reflection type hologram (2011 or 2252) and the step of illuminating reconstruction light to the master hologram through the recording film so that the reflected and diffracted light from the reflection type hologram interferes with the incident light to form interference fringes and the step of recording such in the hologram recording film, (please Figures 37 and 38, columns 18-19). Kawazoe et al clearly teaches the non-zero order diffracted light reconstructed from the master holographic optical element reenters the photosensitive plate through the master hologram to interfere with the incident light

Art Unit: 2872

that includes the zero order light in the photosensitive plate to form interference fringes and recorded such in the photosensitive plate, (please see Figures 18 (a) and 18 (b) and columns 12-13). This reference has met all the limitations of the claims with the exception that it does not disclose explicitly that the recorded hologram medium or the produced holographic optical element comprises a collection of pixels including a plurality of diffraction gratings having such holographic optical elements. However since the claim fails to disclose the specific steps for carrying out the making of the plurality of holograms or holographic optical elements and it appears that making one holographic element or a plurality of them would require the same essential steps as taught by Kawazoe et al as disclosed above such modification would therefore have been considered as the manner in which a claimed apparatus or method intended to be employed and it does not differentiate the claimed methods from prior art methods satisfying the claimed method steps. Ex Parte Masham, 2 USPQ2d 1647 (1987).

Kawazoe et al further teaches that the zero order diffracted light reflected from the holographic optical element (or the master hologram) may be absorbed by painting the back surface of the element in black, (please see Figures 38 and 39, elements 2253 or 2263 and column 19), to filter and prevent the reflected zero order light from entering the photosensitive material to form noise hologram. Although this reference does not explicitly point out that the black paint used may also absorb the higher orders diffracted light beams however such feature is inherently included since the black paint has the ability of absorbing light of different color or wavelengths wherein the higher orders of diffracted light may have different wavelengths that are naturally absorbed by the black paint.

Kawazoe et al also does not teach explicitly that the holographic optical element produced is a volume hologram and it does not disclose explicitly that the reflection type master hologram used for recording is a relief hologram. However since both volume hologram and thin hologram are known types of holograms only are distinguished by the fringes size comparing to the thickness of the recording film and since the specification fails to teach the criticality of having a volume hologram would overcome any

Art Unit: 2872

problem presented in the prior art it would therefore have been an obvious variation and an obvious matter of design choice to one having ordinary skill in the art to produce the holographic optical element as a volume hologram. A relief type of hologram is also one of the well known types of fringes may be recorded in hologram therefore to use a relief type hologram or other type of hologram as the master hologram for recording is rather an obvious variation to one skilled in the art and is an obvious matter of design choice that requires only routine skill in the art since the specification also fails to disclose the criticality of using a relief type hologram would overcome any problem stated in the prior art.

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Molteni et al (PN. 5,473,447).

Molteni et al teaches a hologram stereogram recording method wherein the method comprises the step of providing a hologram recording plate (37) on one side of a transmission hologram (H_1) that serves as the master hologram, which has a plurality of strip holograms that each represents a different view of a scene and a corresponding slit (17), and the step of illuminating the transmission hologram by coherence beams (36) to reconstruct the plurality of these strip holograms in series wherein each of the reconstructed strip holograms interferes with the coherence reference beams (38), illuminated from the other side of the recording plate (37), to produce interference fringes and to record such in the recording plate (37). The produced hologram (H_2) from the recording plate (37) is a holographic stereogram, which comprises the plurality of perspective views, originally recorded in the master hologram (H_1), (please see Figure 6 and columns 13-14). This reference has met all the limitations of the claim. Molteni et al also teaches that the recording plate may be formed by any suitable hologram recording material but it does not disclose explicitly that it is photosensitive material. However such feature is either inherently met since Molteni et al teaches that the hologram is recorded by the interference between illuminated coherent light where photosensitive property is an essential property required in the recording plate to make the recording

Art Unit: 2872

possible or an obvious modification to one skilled in the art since photosensitive materials are very well known hologram recording material and it has been held to select a known material on the basis of its suitability for the intended use is a matter of design choice. In re Leshin, 125 USPQ 416.

Molteni et al teaches that the master hologram (H_1) comprises a plurality of strip holograms that each has an interference fringe pattern corresponding to one of the two dimensional images or the perspective views and the slit apertures, (please see Figures 3-5). These plurality of strip holograms serve as the first and the second transmission type holograms as the master holograms to record different interference fringes on the holographic recording plate (37) in series which then produce the holographic stereogram (H_2). Although this reference does not teach explicitly to "replace" the first hologram with the second hologram however such replacement is inherently implied when each of the perspective views of the strip holograms is recorded serially on the recording plate (37).

Molteni et al also does not disclose explicitly that the produced hologram is a volume hologram however since both volume hologram and thin hologram are known types of holograms distinguished only by the fringes size comparing to the thickness of the recording plate and since the specification fails to disclose the criticality of having a volume hologram would overcome any problem presented in the prior art it would therefore have been an obvious variation and an obvious matter of design choice to one having ordinary skilled in the art to produce the hologram as a volume hologram.

9. Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Kawazoe et al as applied to claim 28 above, and further in view of the patent issued to Kawayama et al (PN. 4,720,158).

The methods for producing a holographic optical element taught by Kawazoe et al as described for claim 28 above has met all the limitations of the claims with the exception that this reference does not teach that the reflection type hologram or the master hologram is a computer generated

Art Unit: 2872

hologram. However computer generated hologram is an extremely well known type of hologram in the art as demonstrated by the teachings of Kawayama et al wherein a master hologram made by computer generation is used to produce other holograms, (please see Figure 6 and column 5, lines 58-65). It would then have been obvious to one skilled in the art to apply the teachings of Kawayama et al to modify the reflection type hologram or the master hologram of Kawazoe et al to make it a computer generated hologram for the benefit of using a computer to more accurately calculate and design the master hologram.

Response to Arguments

10. Applicant's arguments filed on September 18, 2000 have been fully considered but they are not persuasive. The newly submitted claim is fully considered and it is rejected for the reasons stated above.

11. Applicant's arguments are fully addressed in the paragraphs above. In response to applicant's argument that states that a black paint does not filter higher orders of diffracted light the examiner respectfully disagrees. The black paint has the same if not more absorption function and absorption spectra as of the dichroic filter used by the applicant as the means to filter and absorb higher orders of diffracted light. The examiner also wishes to point out that this absorption function is the essential property of a black paint as demonstrated in the reference of Pike (PN. 5,475,201) wherein by painting the housing in black would make both higher grating orders and non-diffracted beams lost in the wall, (please see column 5, lines 12-15).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent issued to Pike (PN. 5,475,201) discloses that higher grating orders and non-diffracted light would be lost in a black wall of housing.

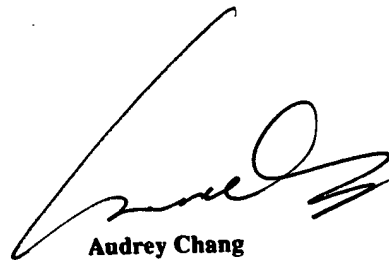
Art Unit: 2872

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A. Chang
November 9, 2000

A handwritten signature in black ink, appearing to read 'Audrey Chang', with a long, sweeping horizontal stroke extending to the left.

**Audrey Chang
Primary Examiner
Technology Center 2800**